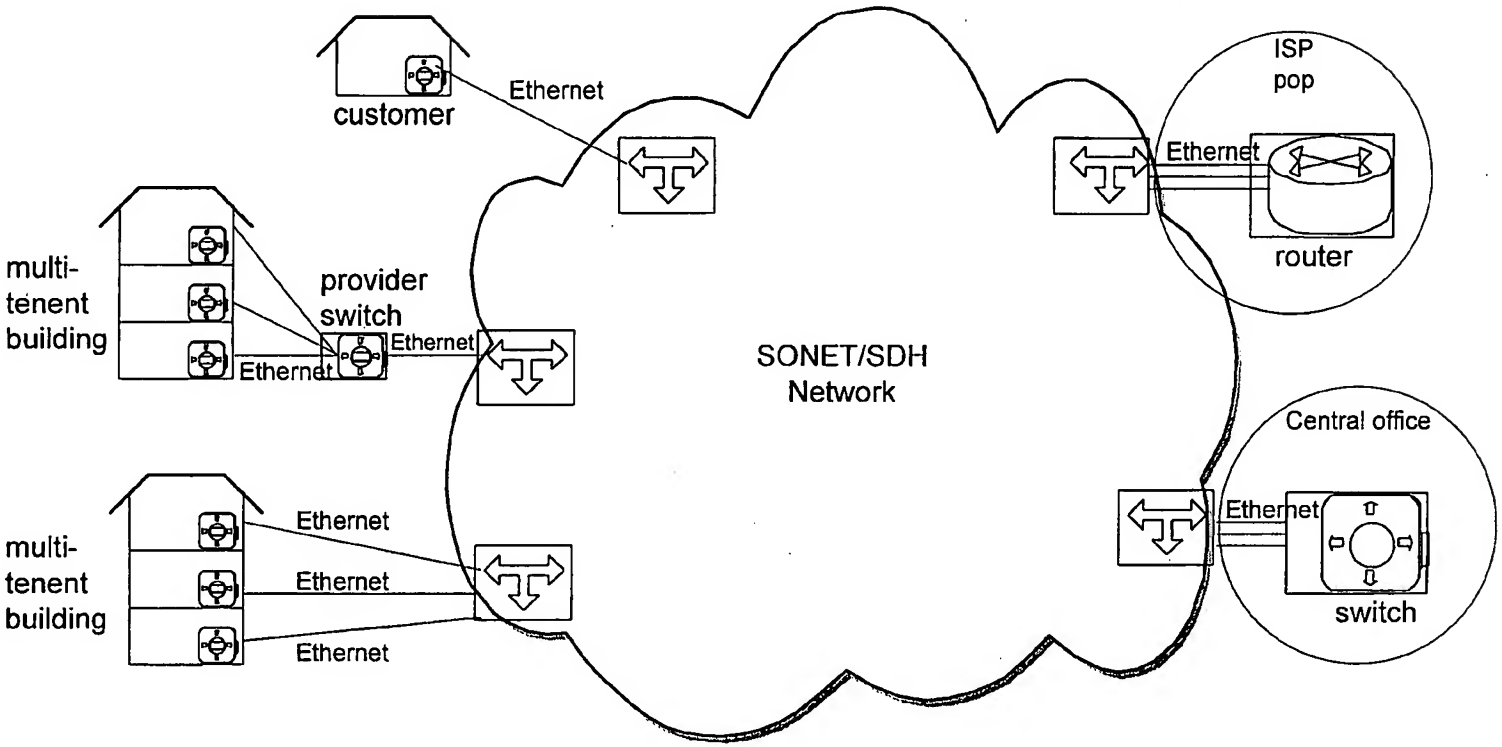
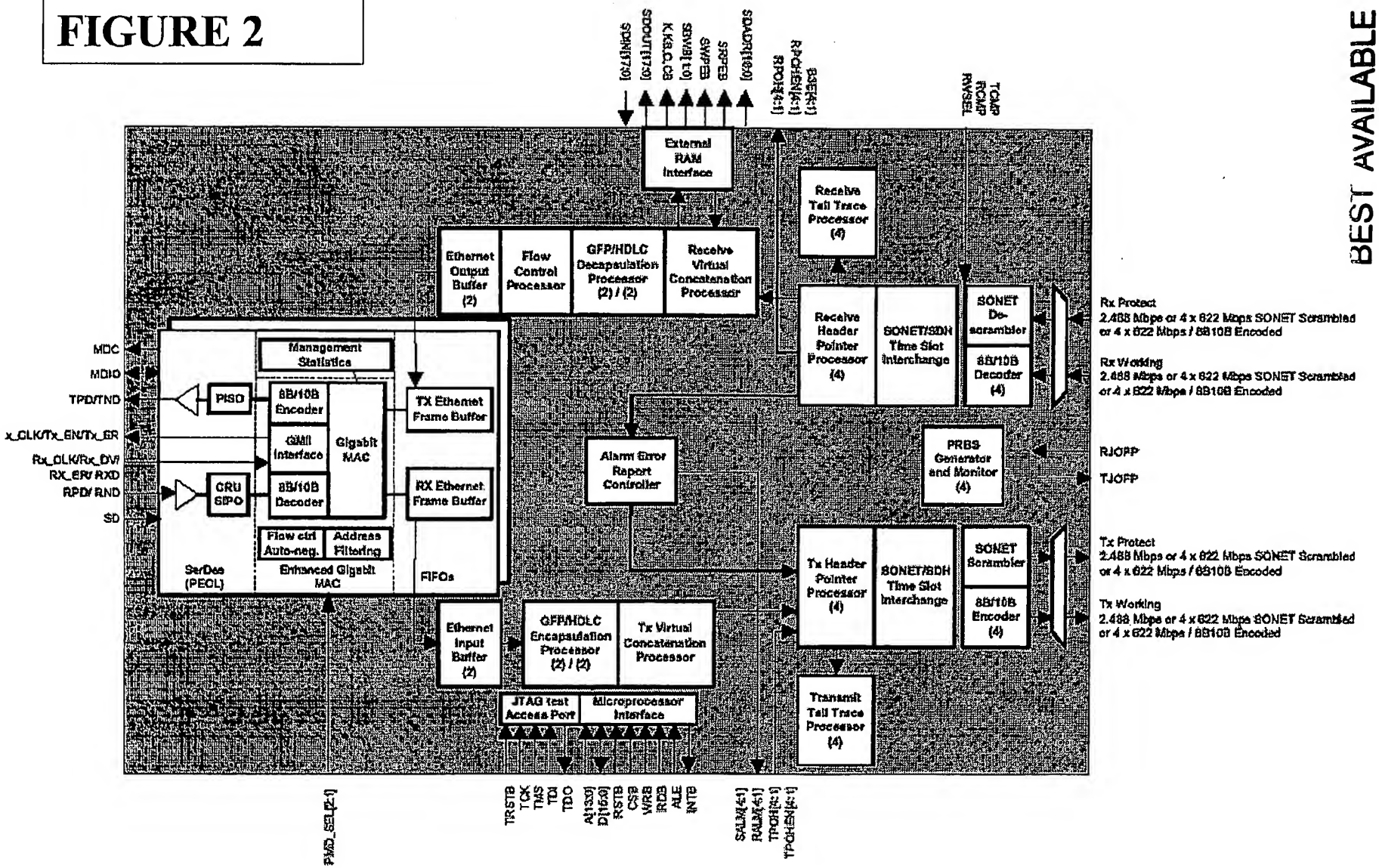


Figure 1: Ethernet over SONET

FIGURE 2



BEST AVAILABLE COPY

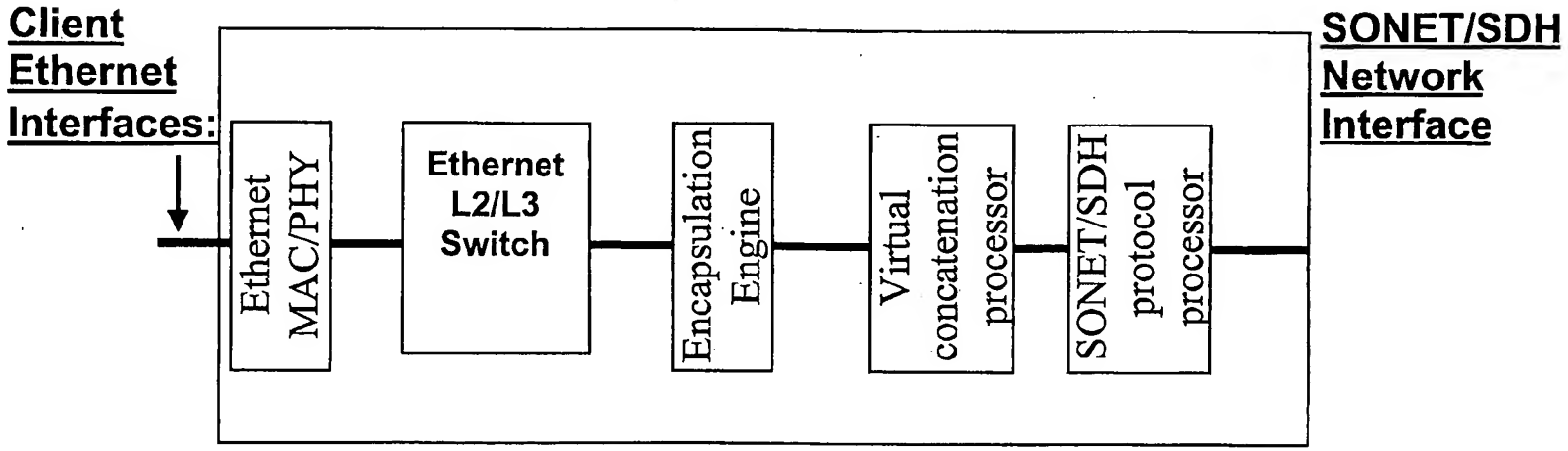

Client
Ethernet
Interfaces:
Ethernet
MAC/PHY
Ethernet
L2/L3
Switch
Encapsulation
Engine
Virtual
concatenation
processor
SONET/SDH
protocol
processor
SONET/SDH
Network
Interface

FIGURE 3

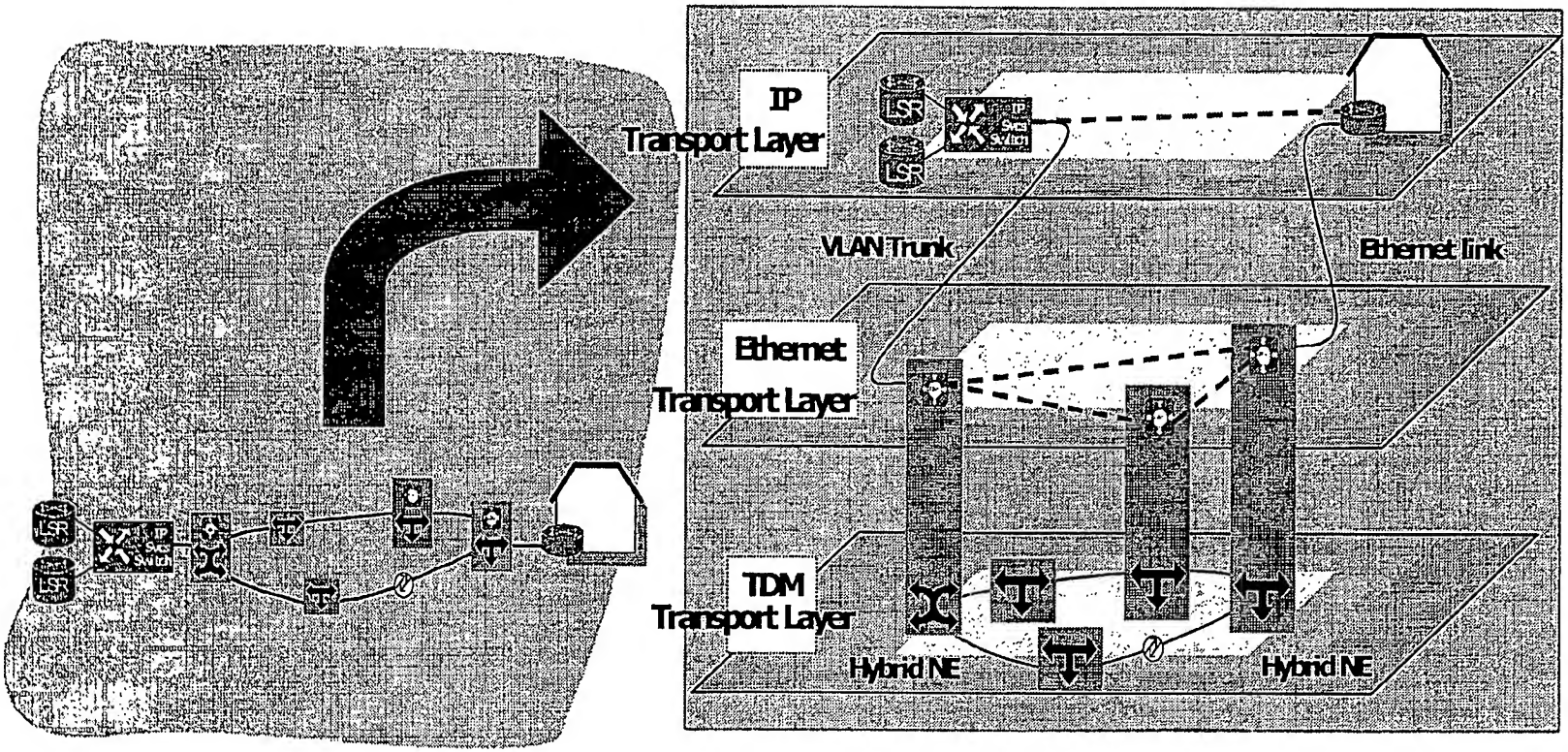


FIGURE 4

BEST AVAILABLE COPY

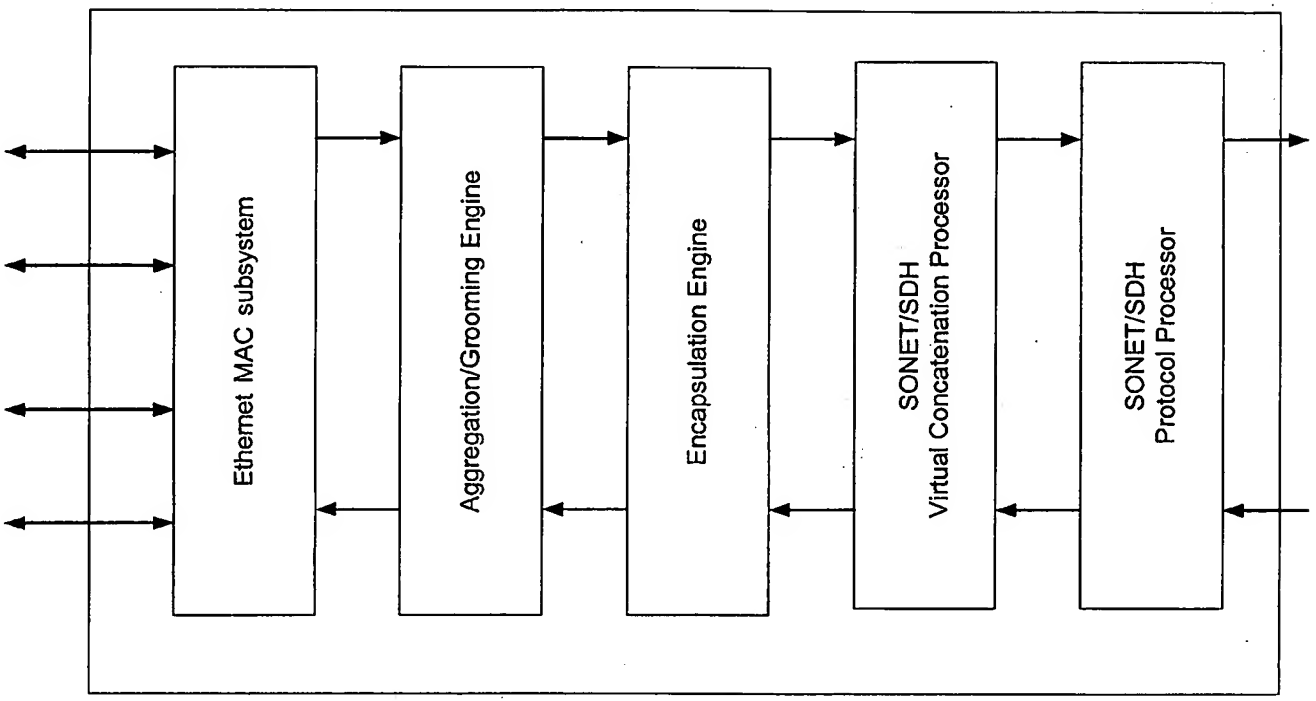

Ethernet MAC subsystem
Aggregation/Grooming Engine
Encapsulation Engine
SONET/SDH
Virtual Concatenation Processor
SONET/SDH
Protocol Processor

FIGURE 5

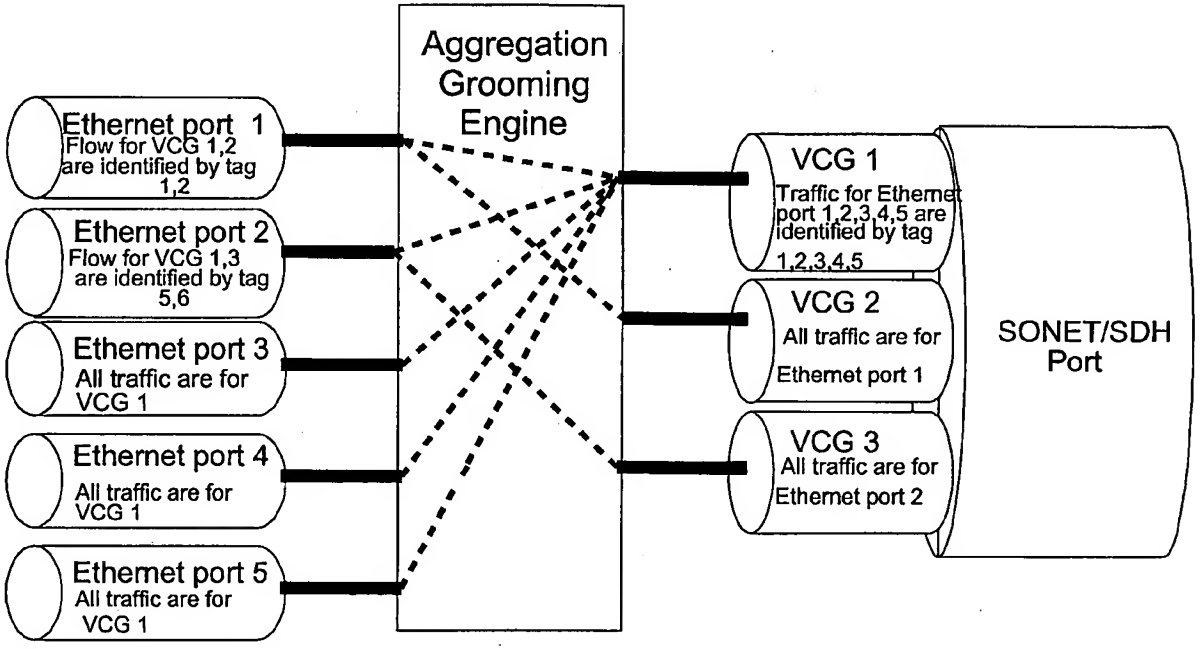

Aggregation Grooming Engine
Ethernet port 1
Flow for VCG 1,2 are identified by tag 1,2
Ethernet port 2
Flow for VCG 1,3 are identified by tag 5,6
Ethernet port 3
All traffic are for VCG 1
Ethernet port 4
All traffic are for VCG 1
Ethernet port 5
All traffic are for VCG 1
VCG 1
Traffic for Ethernet port 1,2,3,4,5 are identified by tag 1,2,3,4,5
VCG 2
All traffic are for Ethernet port 1
VCG 3
All traffic are for Ethernet port 2
SONET/SDH Port

FIGURE 6

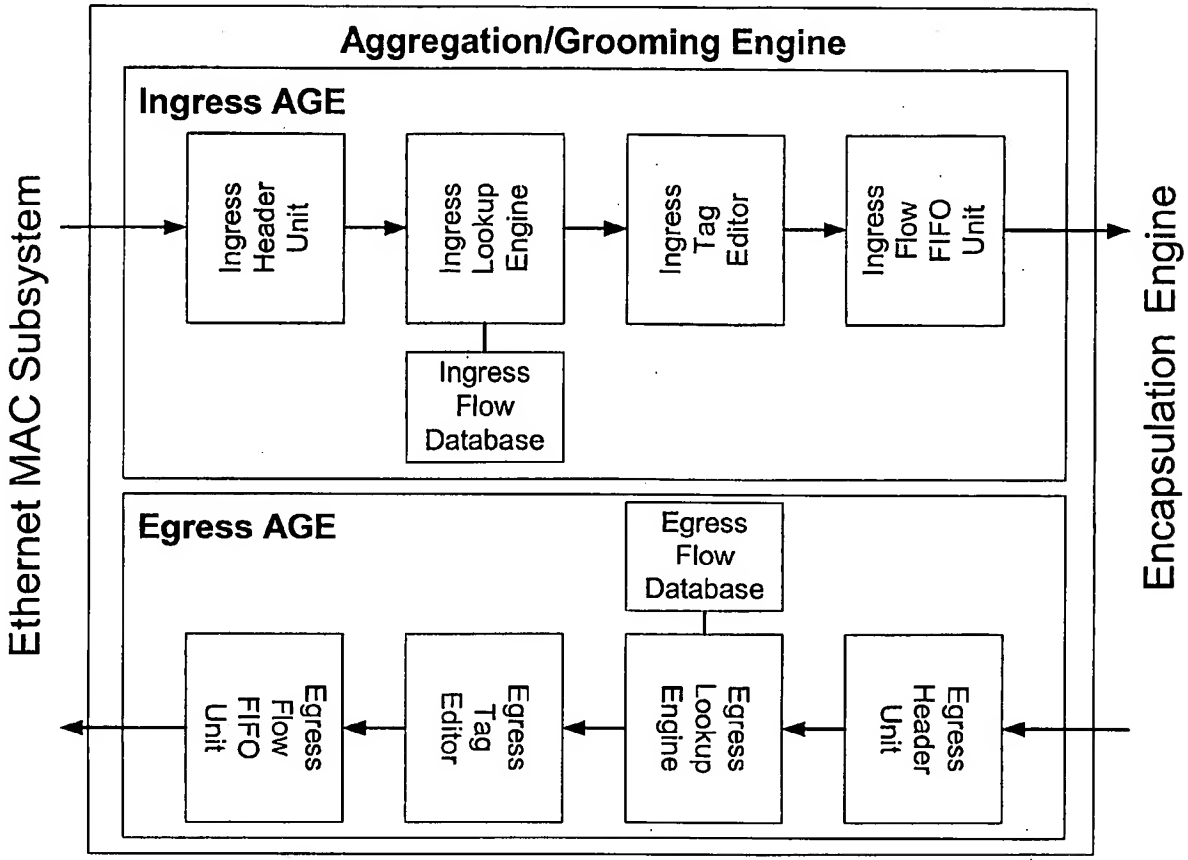

Aggregation/Grooming Engine
Ingress AGE
Ingress Header Unit
Ingress Lookup Engine
Ingress Tag Editor
Ingress Flow FIFO Unit
Ingress Flow Database
Egress AGE
Egress Flow Database
Egress Flow FIFO Unit
Egress Tag Editor
Egress Lookup Engine
Egress Header Unit
Ethernet MAC Subsystem
Encapsulation Engine

FIGURE 7

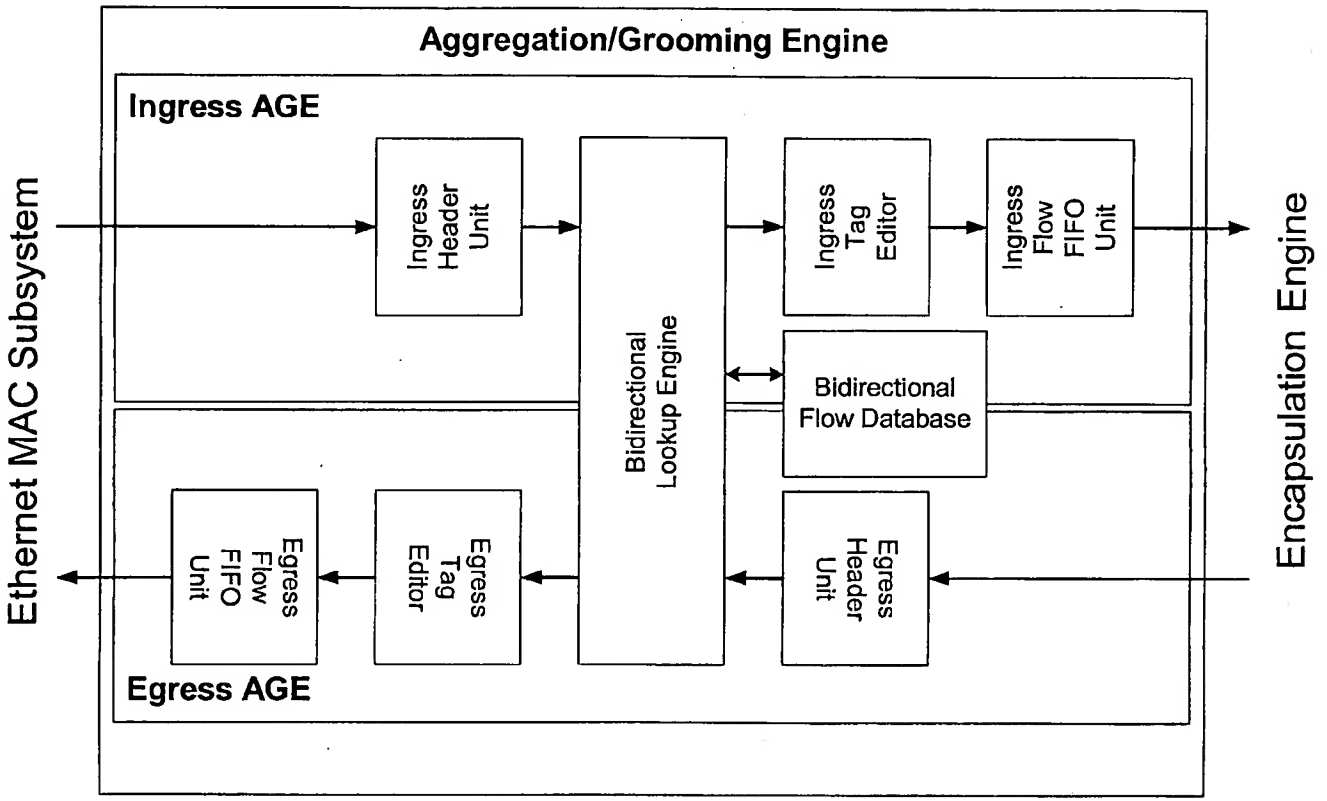

Aggregation/Grooming Engine
Ingress AGE
Ingress Header Unit
Bidirectional Lookup Engine
Ingress Tag Editor
Ingress Flow FIFO Unit
Bidirectional Flow Database
Egress Flow FIFO Unit
Egress Tag Editor
Egress Header Unit
Egress AGE
Ethernet MAC Subsystem
Encapsulation Engine

FIGURE 8

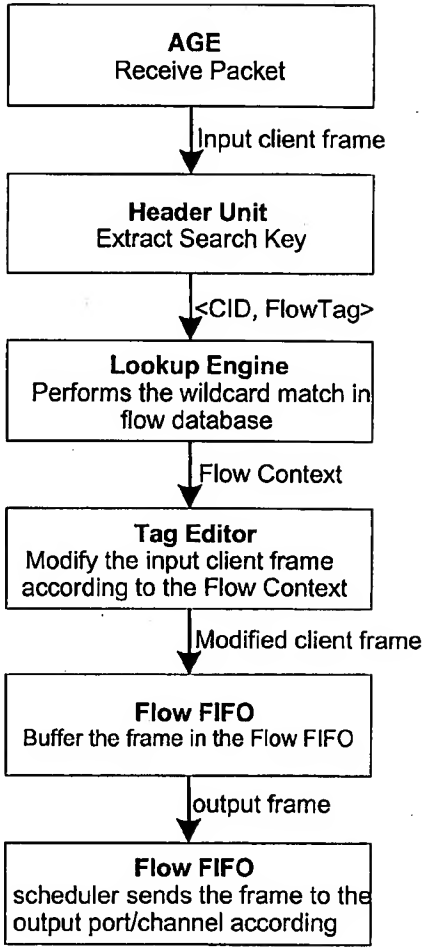

AGE
Receive Packet
Input client frame
Header Unit
Extract Search Key
<CID, FlowTag>
Lookup Engine
Performs the wildcard match in flow database
Flow Context
Tag Editor
Modify the input client frame according to the Flow Context
Modified client frame
Flow FIFO
Buffer the frame in the Flow FIFO
output frame
Flow FIFO
scheduler sends the frame to the output port/channel according

FIGURE 9

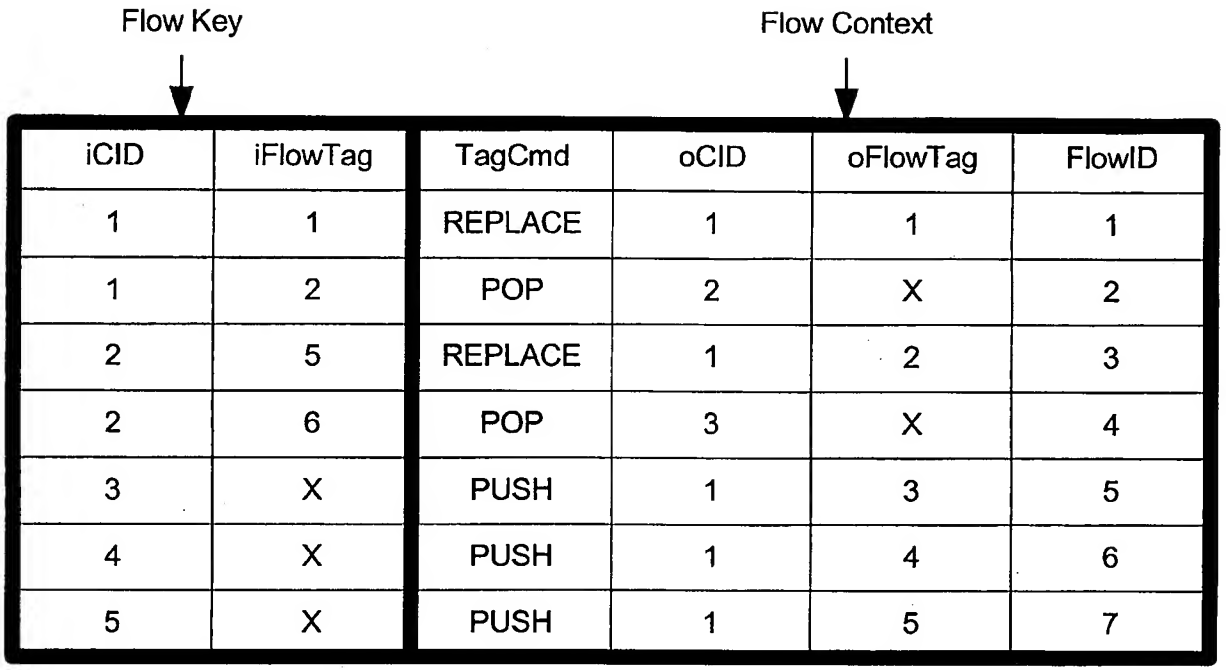

Flow Key
Flow Context
iCID
iFlowTag
TagCmd
oCID
oFlowTag
FlowID
1 1 REPLACE 1 1 1
1 2 POP 2 X 2
2 5 REPLACE 1 2 3
2 6 POP 3 X 4
3 X PUSH 1 3 5
4 X PUSH 1 4 6
5 X PUSH 1 5 7

FIGURE 10

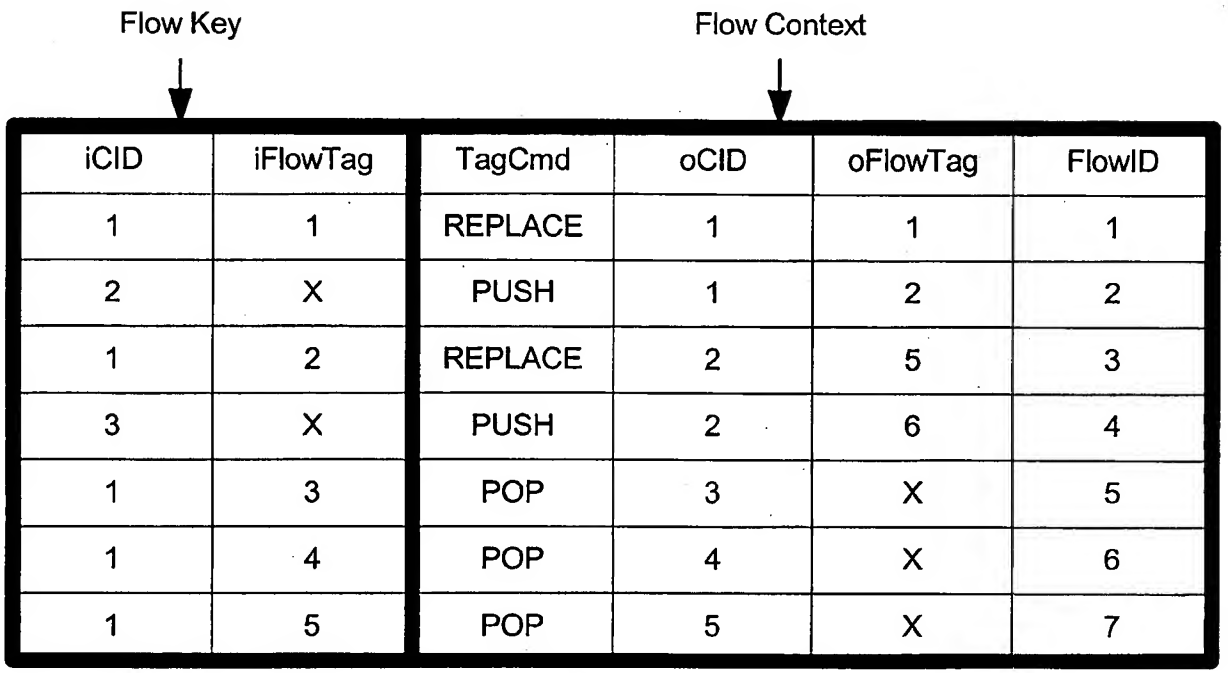

Flow Key
Flow Context
iCID
iFlowTag
TagCmd
oCID
oFlowTag
FlowID
1
1
REPLACE
1
1
1
2
X
PUSH
1
2
2
1
2
REPLACE
2
5
3
3
X
PUSH
2
6
4
1
3
POP
3
X
5
1
4
POP
4
X
6
1
5
POP
5
X
7

FIGURE 11

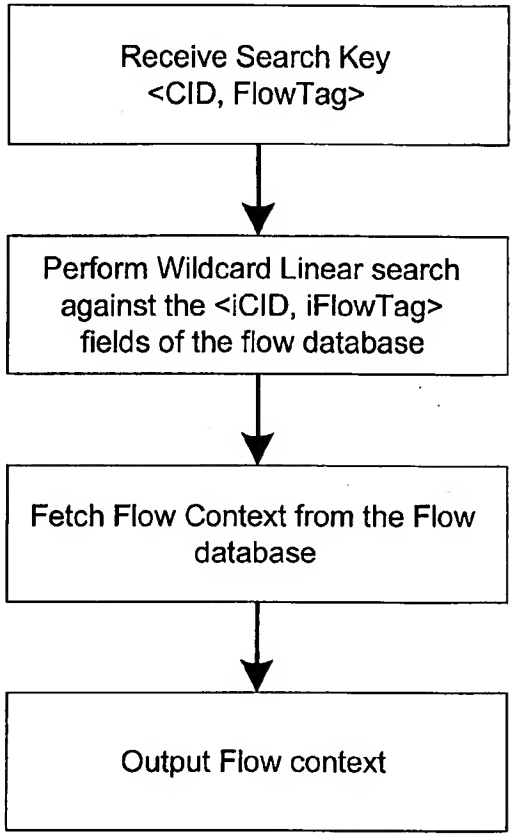

Receive Search Key
<CID, FlowTag>
Perform Wildcard Linear search against the <iCID, iFlowTag> fields of the flow database
Fetch Flow Context from the Flow database
Output Flow context

FIGURE 12

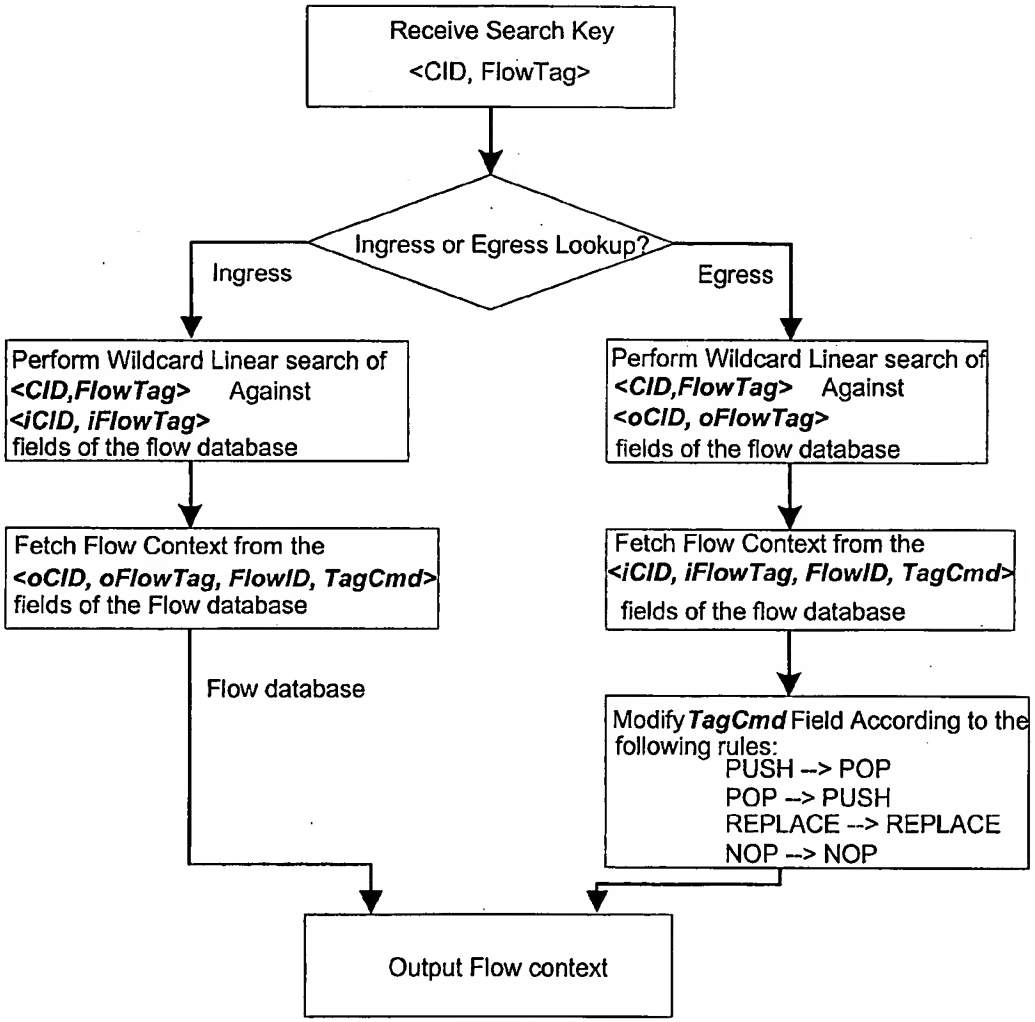

Receive Search Key
<CID, FlowTag>
Ingress or Egress Lookup?
Ingress
Egress
Perform Wildcard Linear search of
<CID,FlowTag> Against
<iCID, iFlowTag>
fields of the flow database
Perform Wildcard Linear search of
<CID,FlowTag> Against
<oCID, oFlowTag>
fields of the flow database
Fetch Flow Context from the
<oCID, oFlowTag, FlowID, TagCmd>
fields of the Flow database
Fetch Flow Context from the
<iCID, iFlowTag, FlowID, TagCmd>
fields of the flow database
Flow database
Modify TagCmd Field According to the following rules:
PUSH --> POP
POP --> PUSH
REPLACE --> REPLACE
NOP --> NOP
Output Flow context

FIGURE 13